

Rhodora

JOURNAL OF THE
NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS

MERRITT LYNDON FERNALD

HOLLIS WEBSTER

} Associate Editors.

WILLIAM PENN RICH

EDWARD LOTHROP RAND

} Publication Committee.

Vol. 9.

July, 1907.

No. 103.

CONTENTS:

Some Forms of New England Trees. <i>A. Rehder</i>	109
Flora of the Great Swamp of Rhode Island. <i>E. S. Reynolds</i>	117
Retrograde Color Varieties of <i>Gratiola aurea</i> . <i>H. H. Bartlett</i>	122
Meeting of the Josselyn Botanical Society. <i>E. B. Chamberlain</i>	124

Boston, Mass.

740 Exchange Building.



Providence, R. I.

Preston and Rounds Co.

RHODORA.—A monthly journal of botany, devoted primarily to the flora of New England. Price \$1.00 per year (\$1.25 to all foreign countries except Canada); single copies 15 cents. Volume 1, \$2.00, Vol. 2, \$1.50. All remittances by check or draft, except on Boston or New York, must include ten cents additional for cost of collection. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be gladly received and published to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than one page of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

Address manuscripts and proofs to

B. L. ROBINSON, Clement Circle, Cambridge, Mass.

Subscriptions, advertisements, and business communications to

W. P. RICH, 300 Massachusetts Avenue, Boston, Mass.

Single copies may be had from

E. L. RAND, Corresponding Sec'y N. E. Botanical Club,
740 Exchange Building, Boston, Mass.

Entered at Boston, Mass., Post office as Second Class Mail Matter

SYNOPTICAL FLORA OF NORTH AMERICA, by A. GRAY and others. Vol. I. Fascicles 1 and 2. A critical treatment of forty-five families of polypetalæ (*Ranunculaceæ* to *Polygalaceæ*) 1895-1897. \$5.20.—GRAY HERBARIUM of Harvard University, Cambridge, Mass.

NEW ENGLAND WILD FLOWERS AND THEIR SEASONS,
by WILLIAM WHITMAN BAILEY. Price 75 cents net.—PRESTON &
ROUNDS CO., Providence, R. I.

NOTICE

On and after April 1, 1907, the price of Volume 1, (1899) of *RHODORA* will be \$2.00, and Volume 2, \$1.50.

Complete sets of these two volumes are in very limited supply and will soon be exhausted. Volumes 3 to 8 can still be supplied at \$1.00 each, unbound.

HARDY NATIVE AMERICAN PLANTS
and Carolina Mountain Flowers. Many new rare and local varieties.

Prop. Highlands Nursery,
Kawana, North Carolina

HARLAN P. KELSEY, Landscape Architect,
Tremont Building, Boston.

Catalogues.
Consultation and plans for improvement of estates, private
and public grounds, suburban properties and resorts.

Advertisements of Nurserymen and Dealers in Botanical and other Scientific Publications are inserted in these pages at the following rates per space of 4 in. by 3-4 in. 1 year \$4.00, 6 months \$2 50.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 9.

July, 1907.

No. 103.

SOME NEW OR LITTLE KNOWN FORMS OF NEW ENGLAND TREES.

ALFRED REHDER.

THE following descriptions of some little known varieties and forms of trees are presented here chiefly for the purpose of drawing the attention of collecting botanists to these variations. Trees and particularly the more common trees are often passed by by botanists, and therefore are usually not well represented in our collections, a fact that makes it difficult to trace the frequency of unexpected forms. We have still much to learn even in a so comparatively well explored region as New England in regard to the distribution of certain varieties and the frequency of the occurrence of certain forms of trees. That forms like the virgate form of the Red Spruce and the cut-leaved forms of Sumach due to spontaneous mutation may occur repeatedly and independently, has been shown by the observation made in Europe on allied species. We also may be on the look out for similar forms in other species or genera.

Picea mariana* var. *brevifolia comb. nov.—*P. brevifolia* Peck, Spruces of the Adirondacks, 13 (1897); Britton, Ill. Flor. 3: 496 fig. 122a (1898); Man. 34 (1901); Brotherton, Amer. Gard. 21: 201, 2 fig. (1900).—*P. nigra* var. *brevifolia* Rehder, Bailey's Cycl. Am. Hort. 3: 1334 (1901).

Differs from the type chiefly in its smaller glaucous leaves. It is a small tree, rarely exceeding 10 m. in height with a narrow spire-like head of irregular outline; leaves 4–12 mm. long, stout, obtuse or mucronate, glaucous; cones 1.2–2.5 cm. long, the scales with erose margins; seeds 2 mm. long, with wings 4–5 mm. in length.

This variety is credited by Britton to Vermont, but I fail to find

in the herbariums consulted any specimens from this state. There are, however, the following specimens from Maine and New Hampshire which are referable to this variety. MAINE: Bangor bog, Orono, July 20, 1892, *M. L. Fernald*; Somerset Co., peat bog, Flagstaff, Aug. 19, 1896, *M. L. Fernald*; Piscataquis Co., Mt. Ktaadn, July 8, 1900, *J. R. Churchill*. NEW HAMPSHIRE: summit of Thorn Mtn., Jackson, Oct. 4, 1896, *C. E. Faxon*. *Picea mariana* var. *brevifolia* inhabits chiefly mountain bogs and is distributed outside of New England to Ontario, northern New York and Michigan. The low prostrate form of the exposed tops of high mountains described by Peck as *P. brevifolia* var. *semiprostrata*, will probably also be found in New England. A form similar in habit and in the size of leaves and cones which I found on top of Mt. Mansfield in Vermont is apparently a low form of the true *P. mariana*, as it has dark green leaves.

Picea rubra forma *virgata* comb. nov.—*Picea mariana* “monstrous form” Gard. & Forest 8: 45 fig. (1895).—*Picea rubens* “form” Sargent, Sylv. N. Am. 12: 33 (1898).—*Picea nigra* var. *virgata* Rehder; Bailey’s Cycl. Am. Hort. 3: 1334 (1901).

Differs from the type by the long and slender branches entirely destitute of branchlets.

MASSACHUSETTS: on the base of Mt. Hopkins near Williamstown, one plant found by Mr. George Walker and specimens with a photograph sent by Samuel F. Clarke in 1894 to the Arnold Arboretum.

A very peculiar looking Spruce and interesting as a parallel form to *P. Abies* f. *virgata* (*P. excelsa* var. *virgata* Caspary), Schlangenfichte (Snake-Spruce), found in quite a number of localities in central and northern Europe, particularly in Norway. A comparison of the figure given in Garden & Forest (l. c.) of the “snake” form of *P. rubra* and of the figures of *P. Abies* f. *virgata* published by Carrière (Rev. Hort. 1854: 102) and by Schübelér (Viridarium Norwegicum 1: 411, fig. 69. 1886 and Gartenfl. 1: 521. 1887) show that there is hardly any difference in habit between these forms of the two species. It may be reasonably expected, that other plants of this form of *P. rubra* will be discovered in time, as the European Snake-Spruce also has been found many times, usually only in single plants which undoubtedly originated independently by mutation, and sometimes in colonies; in the latter case they were probably seedlings of a single mother tree. The offspring of the Snake-Spruce represents partly the true snake form and partly forms intermediate

between this form and the type of the species; such was at least the case in a number of seedling plants I saw in the park at Reinhardtbrunn in the Thuringian Mountains. Trees propagated by grafting are planted occasionally in European gardens. *Picea rubra* f. *virgata* may now likewise be found in some gardens, for Prof. S. F. Clarke stated in a letter to Prof. C. S. Sargent, that Mr. G. Walker made cuttings of this Spruce. A grafted plant of this form lived in the Arnold Arboretum for years but died unfortunately a few years ago.

BETULA LENTA L. forma **laciniata** f. n.—*Betula lenta* "form" Sanford, RHODORA 4: 83. (1902.)

A typo differt foliis inciso-lobatis, lobis utrinque 6-9 argute serratis, inferioribus circa 1 cm. longis apicem versus decipientibus et in serraturas angustas acuminis transeuntibus.

Differs from the type by the incised lobed leaves. Leaves 6-8 cm. long, subcordate or truncate at the base, long acuminate on each side with 6-9 ovate-lanceolate, sharply serrate and acuminate lobes, the lower ones about 1 cm. long and gradually passing into the sharply serrate apex.

NEW HAMPSHIRE: New Boston, Aug. 1901, S. N. F. Sanford (Herb. Gray) and July 31, 1902, E. W. Morse, (Herb. Arnold Arboretum).

This is interesting as a parallel form to the Old World *Betula pendula* f. *dalecarlica* (L.) C. K. Schneider and *Betula alba* var. *urticifolia* Regel, both of which have been repeatedly found wild in Scandinavia. Of the form here described only a single tree of about 12 feet height has been found by Mr. Sanford near New Boston at an altitude of about 1200 feet as stated by him in the article referred to above. Judging from his description as well as from the specimens the tree possesses ornamental qualities which would make its introduction into our gardens desirable. This could be easily accomplished by grafting and this would be done at the Arnold Arboretum, if branches were sent late in fall or during the winter to this institution.

FAGUS GRANDIFOLIA Ehrh. forma **pubescens** Fernald & Rehder, f. n.

A typo differt foliis subtus tota facie pilosis sed marginem versus saepe glabrescentibus, ad venas villosis.

Differs from the type in having the under side of the leaves short-pubescent, but toward the margin often glabrescent and the veins covered with a villous pubescence, not with long silky hairs.

MASSACHUSETTS: South Braintree, May 30, 1907 and Bee Hill near Williamstown, June 28, 1904, *Alfred Rehder*. RHODE ISLAND: Tiverton, Aug. 1879, *C. S. Sargent*. In cultivation at the Arnold Arboretum and also in Germany: Muskau (Silesia), Arboretum, July 23, 1901, *Alfred Rehder*.

The specimen from Rhode Island approaches the southern form by its very broad leaves and the somewhat shorter prickles. The specimens from the Arnold Arboretum from Muskau, which lack the fruits, are more densely pubescent than the other specimens and very like the pubescent form of the southern variety, but the foliage is that of the northern form.

Though the American Beech is usually considered a very homogenous species, the comparison of a large amount of material from the whole range of the species shows that this is not the case and that some authors, particularly the younger Michaux, have shown a very good judgment in distinguishing a northern and a southern Beech and that furthermore the description by some old authors as Aiton and Willdenow of the leaves as tomentose or pubescent beneath was quite correct as regards the technical meaning of these words and did not refer to the silky hairs of the young leaves. My attention was first drawn to these variations when I found several years ago a pubescent form in cultivation in Germany. As I recently consulted the Gray Herbarium with the intention to pursue the matter further, I learned from Professor Fernald that he also had made investigations in this respect, the results of which proved almost identical with the conclusions I had reached.

The distinction of the two geographical varieties with pubescent and glabrous forms presents no difficulties, but the nomenclature seems somewhat complicated. During the nomenclatural unrest of the two last decades the names *F. americana*, *F. atropunicea*, and *F. latifolia*, combinations based on older trinomials, had been substituted for the well known *F. ferruginea* by various American authors, but according to the Vienna rules the oldest binomial available is *F. grandifolia* of Ehrhart, which is one year older than Aiton's *F. ferruginea*. By this nomenclatorial change we avoid the rather awkward situation that a very rare form should constitute the type of this widely distributed American tree, for *F. ferruginea* Aiton is apparently based on one of the hitherto almost unknown pubescent forms of the Beech. This is shown by the description "*foliis subtus tomentosis*" in *Hortus*

Kewensis and still more conclusively by the manuscript of Solander for Aiton's Hortus Kewensis, where the habitat is quoted as "Habitat in Marylandia, Jones, in Pennsylvania Math. Hultgren." The specimen collected by Math. Hultgren in Pennsylvania in 1781 is still in the herbarium of the British Museum and has according to Mr. E. G. Baker, to whom we are indebted for a copy of the manuscript description and a tracing of the specimen, the leaves densely and softly pubescent beneath. From the published description however, it seems as if the species were based on Lee's cultivated plant. Ehrhart's *F. grandifolia* represents apparently the northern form. It was described from cultivated plants and Münchhausen's *F. americana latifolia* and Duroi's *F. sylvatica c. americana latifolia* based also on cultivated plants quoted as synonyms; these were probably of the same origin as Lee's plant, which is, according to Loudon's description and the figure of his *F. ferruginea* var. *latifolia*, the northern form and also according to a specimen in the herbarium of the Arnold Arboretum collected at Kew and labeled *F. ferruginea* var. *latifolia* (C. Lee & Son). The *F. Americana latifolia* of Wangenheim also represents the northern form. Thus the name *F. grandifolia* Ehrh. remains with the northern variety as the type and for the southern variety the first available varietal name is *F. ferruginea* var. *caroliniana* of Loudon. The synonymy and the description of the varieties and forms to be distinguished may be appended here.

FAGUS GRANDIFOLIA Ehrhart, Beytr. Naturk. 3: 22 (1788).—*F. Americana latifolia* Muenchhausen, Hausv. 5: 162 (1770); Wangenheim, Beytr. Forstwiss. 80, pl. 29, fig. 55, (1787).—*F. sylvatica c. Americana latifolia* Duroi, Harbk. Baumz. 1: 269 (1771).—*F. sylvatica atropunicea* Marshall, Arbust. Am. 22 (1785).—*F. sylvatica* Schoepf, Mat. Med. Am. 140 (1787), not Linné.—*F. ferruginea* Aiton, Hort. Kew. 3: 362 (1789); F. A. Michaux, Hist. Arb. Am. 2: 174, pl. 9. (1812); Rafinesque, New Fl. 3: 80 (1836).—*F. sylvestris*, A. Michaux, Flor. Bor. Am. 2: 194 (1803).—*F. sylvatica* β *americana*, Nuttall, Gen. 2: 216 (1818); Emerson, Trees Mass. ed. 2. 180, pl. (1875).—*F. Americana* Sweet, Hort. Brit. 370 (1826); Sargent, Sylv. N. Am. 9: 27, pl. 444 (1896).—*F. ferruginea* var. *latifolia* Loudon, Arb. Frut. Brit. 3: 1980. fig. 1916 (1838).—*F. atropunicea* Sudworth, Bull. Torr. Bot. Club. 20: 42 (1893).—*F. latifolia* Sudworth, Nomencl. Arb. Fl. U. S. 148 (1897).

The type of the species is characterized by the long and slender

prickles, sometimes nearly 1 cm. long, of the usually ashy gray or yellowish tomentose involucre, by the thinner texture and more yellowish green color of the distinctly serrate leaves which are usually cuneate at the base. Of the synonyms quoted above only *F. ferruginea* of Michaux and of Rafinesque and *F. ferruginea latifolia* Loudon refer to this variety as distinguished expressly from the southern variety. It is distributed from Nova Scotia to Ontario and Minnesota and in the mountains as far south as Virginia.

Forma *pubescens* is described above.

Var. **caroliniana** Fernald & Rehder, comb. nov.—*F. sylvatica* Walter, Fl. Carol. 233 (1788).—*F. sylvestris* F. A. Michaux, Hist. Arb. Am. 2: 170, pl. 8. (1812).—*F. rotundifolia* Rafinesque, Atlant. Jour. 177. (1833).—*F. alba* Rafinesque, New. Flor. 3: 80 (1836).—*F. heterophylla* Rafinesque, l. c.—*F. nigra* Rafinesque l. c.—*F. ferruginea* var. *caroliniana* Loudon, Arb. Frut. Brit. 3: 1980 fig. 1915 (1838).—*F. ferruginea* Chapman, Fl. S. U. S. 425 (1860).—*F. americana* Small, Fl. S. E. U. S. 347 (1903).

Differs from the type in the shorter and fewer prickles of the densely rufous-tomentose involucre; and the generally smaller fruits not exceeding the involucre, the broader usually only denticulate leaves, often subcordate at the base, at maturity of firmer texture and of a dull dark bluish green color. The characteristic differences in the fruit between the northern and the southern variety are well brought out by the figures of Michaux; and Rafinesque's description of his *F. ferruginea* as having the "female flowers with many linear smooth bracts" shows that he, too, noticed this character. Distributed from New Jersey to Florida and west to southern Illinois, Missouri and Texas. In the border regions of the range of the northern and southern variety intermediate forms are often found and even in southern New England trees approaching the southern variety occur.

forma **mollis** Fernald & Rehder, f. n.—

Differt a varietate *caroliniana* foliis subtus tota facie dense et molliter pubescentibus.

Differs from the variety *caroliniana* by the densely and softly pubescent under side of the leaves.

FLORIDA: Tallahassee, Leon County, Aug. 7-9, 1895 *Geo. V. Nash* (No. 2339). LOUISIANA: New Orleans, 1832, *Drummond* (no. 318).

The type specimen from Florida has ovate or oval, denticulate

leaves distinctly subcordate at the base, while Drummond's specimen has elliptic-oblong leaves, cuneate at the base, and has no fruits, but from its range it apparently belongs to the southern and not to the northern variety. Whether the type of *F. ferruginea* from Pennsylvania is to be referred to f. *pubescens* or to f. *mollis* which seems more probable, must remain doubtful as long as we do not know the fruits.

RHUS TYPHINA L. forma *LACINIATA* Wood, Am. Bot. Flor. pt. 4: 73. (1870) as var.; Flor. Atlant. 73 (1879).

Differs from the type by the irregularly incisely dentate or incisely lobed leaflets which are ovate-oblong to lanceolate and by the leafy panicles. New Hampshire, near Hanover, 1846, *Dr. Rickau* (erroneously spelled Ricard by Wood). (Herb. Gray.)

Rhus typhina L. forma *dissecta*, nom. n.—*R. typhina* var. *laciniata* Hort. [Manning] ex Rehder, Möller's Deutsch. Gärtner-Zeit. 15: 211. fig. (1900); Hort. ex Cowell; Bailey's Cycl. Am. Hort. 4: 1530 (1902). —*R. hirta* var. *laciniata* C. K. Schneider, Ill. Handb. Laubholzk. 2: 154 (1907).

Differs from the type by the bipinnately divided leaves with the leaflets of the second order linear to linear-lanceolate and entire or dentate or sometimes even pinnatifid.

MASSACHUSETTS, locality unknown; found about 15 years ago by J. W. Manning of Reading, Mass. and transplanted into his garden.

A very striking form on account of the graceful feathery appearance of the large (30–45 cm. long) finely dissected leaves. Its ornamental qualities have won for it a place in many American and European gardens particularly in more northern latitudes where the similar but more tender *R. glabra* var. *laciniata* Carr. is not hardy enough.

A few words may be said on the specific name which this species of *Rhus* has to bear. In 1892 Sudworth (Bull. Torr. Bot. Club 19: 81) proposed for it the new combination *R. hirta* (L.), because Linné, prior to the publication of his *Rhus typhina* (Cent. Plant. 2: 14. 1756; Amoen. Acad. 4: 311. 1760) had named the same species *Datisca hirta* (Spec. Plant. 2: 103. 1753) from an abnormal specimen with the inflorescence reverting into leaves and with partly confluent leaflets (see also Britton, Bull. Torr. Bot. Club 18: 269). This explains his placing the plant into an entirely wrong genus. The name *R. hirta*, however, cannot be admitted, according to art. 51, 3 of the Vienna rules of nomenclature, as it is based on a monstrosity.

ACER RUBRUM L. var. TRIDENS Wood, Class Book Bot. 286. (1860); Am. Bot. Flor. pt. 4: 74. (1870); Flor. Atlant. 24. (1879); Sargent, Sylva N. Am. 13: 11, pl. 626 (1902).—*A. rubrum* var. β Torrey & Gray, Flor. N. Am. 1: 249 (1838).—*A. microphyllum* Pax, Bot. Jahrb. 7: 180 (1886).—*A. semiorbiculatum* Pax. l. c. 181.—*A. rubrum* subsp. *microphyllum* Wesmael, Bull. Soc. Bot. Belg. 29: 29 (1890); Schwerin, Gartenfl. 42: 166 (1893) as forma — *A. rubrum* subspec. *microphyllum* Wesmael, l. c.; Schwerin, l. c. fig. 38, as forma; Pax, Engler's Pflanzenreich IV. 163: 38 (1902) as forma — *A. tomentosum* Pax, Engler's Pflanzenreich IV. 163: 38 (1902), not Desfontaines¹ and excl. syn. Marshall² and Kirchner.³

Differs from the type by having smaller leaves usually only 4 to 8 cm. long and obovate in outline, three-lobed at the apex and narrowed from below the middle into the rounded base, usually very glaucous beneath and with long-persistent pubescence, and thick and firm at maturity. The flowers are sometimes yellow and the fruits usually smaller.

MASSACHUSETTS: near Auburndale, May 17, 1904, M. L. Fernald & Alfred Rehder. Only one rather large tree was found. This is the most northern locality yet observed for the variety whose range extends south along the Atlantic coast through Florida into eastern Texas.

In its characteristic form the variety appears well marked, but intermediate states are often met with and three-lobed leaves are occasionally found on trees of the typical form and particularly on stunted trees growing in swamps. In the south occurs a still more

¹ The quotation Desfontaines, Tabl. Écol. Bot. ed. 3 (1829) 136 as given by Pax and also in the Index Kewensis is incorrect; the name without any description appears only in edition 1 (1804) p. 136; in the second and third edition this name and likewise the preceding name *A. coccineum* is omitted and for these two names *A. eriocarpum* Michaux substituted. From this it may be inferred that Desfontaines intended the name *tomentosum* for *A. saccharinum*, but even if an herbarium specimen should still exist and should represent the variety *tridens*, the name cannot be revived as it is indisputably a nomen nudum.

² The quotation of Marshall's *A. glaucum* as a synonym of *A. tomentosum* appears to be hardly more than a guess, for Marshall's very vague description does not even clearly show whether he had *A. rubrum* or *A. saccharinum* in mind.

³ As Kirchner in his short description of *Acer rubrum* var. *tomentosum* (Arb. Muscov. 186. 1864) does not mention the most obvious character, the three-lobed leaves, and as also Count Schwerin, who made a most careful study of the cultivated Maples, describes and figures it as a variety with deeply five-lobed leaves (Gartenfl. 42: 165 fig. 50. 1893) chiefly distinguished by the persistent pubescence of the under side of the leaves and the intensely red flowers, I do not think it advisable to consider Kirchner's name as a synonym of var. *tridens*.

semiorbiculatum

extreme form in which the two lateral lobes are reduced to large teeth, so that the leaves appear undivided and only coarsely dentate and are then ovate to ovate-oblong in shape. To this form belong the following two specimens: FLORIDA, *Chapman* (herb. Gray) and MISSISSIPPI, *Enterprise* May 6, 1880 (herb. Arnold Arboretum). Considering the sporadic distribution of the variety *tridens* through the range of the species and the inconstancy of its characters as is clearly shown by a large number of specimens, one cannot consent to its elevation to specific rank, as was done by Pax, who in his earlier monograph distinguished even two species, *A. microphyllum* with smaller leaves very glaucous beneath and with the petiole shorter than the limb and *A. semiorbiculatum* with larger leaves, green (!) beneath and with the petiole longer than the limb, each species based apparently on a single specimen, collected by Kinn in "Am. bor." without indication of the locality. In his later monograph he reduces the latter species to a form of *A. rubrum* and substitutes for *A. microphyllum* the name *A. tomentosum*.

ARNOLD ARBORETUM.

THE FLORA OF THE GREAT SWAMP OF RHODE ISLAND.

ERNEST SHAW REYNOLDS.

THE Great Swamp of Rhode Island is a region which has long been recognized by botanists as offering a very rich collecting ground, and has often been visited by students of botany. The swamp is located in the southern part of the state, in Washington County, close to the junction of the town lines of Charlestown, Richmond, and South Kingstown. The larger part lies in South Kingstown, though a part of the western half is in the adjoining town of Richmond. It is entirely enclosed between the parallels $41^{\circ} 25'$ and $41^{\circ} 30'$ while the meridian $71^{\circ} 35'$ cuts the swamp area into two nearly equal portions. Excluding the part south of Worden's Pond, the swamp area covers about six square miles, which is the largest tract of land in Rhode Island bearing a swamp flora.

There are, in Washington County, at least fifty large and small swamps, and many more lakes and ponds. A large number of these are located in the glacial drift, which covers large areas in the state, and their origin can undoubtedly be traced to the glacial period. The topographical features surrounding the Great Swamp are especially favorable to the development of a swamp. West and northwest of the region, the land is well elevated above the level of Narragansett Bay, and the soil, Gloucester stony loam,¹ is porous and easily drained. The soil north and east of the swamp is of glacial origin and the land also well elevated. To the south there is a combination of soils, some of glacial origin, and some derived from the country rock. The elevations here are not so marked as on the other sides. The swamp itself, therefore, is in a basin at least a hundred feet lower than the surrounding country, and often more. Within the Great Swamp area there are two hills, a little over one hundred and fifty feet in height, which partly traverse the swamp in a north and south direction, thus offering a ready means of entering the area. On the southern edge is Worden's Pond ninety four feet above sea level and at no point more than a few feet deep. Its total length is not over two miles, and it is a little less than a mile and a quarter wide. Passing through the swamp, and entering the pond from the north are two streams, the larger called the Chipuxet River. Cutting the western half into two nearly equal divisions and serving as a boundary between the towns of South Kingstown and Richmond, is the Usquepaugh River, which eventually empties into the Pawcatuck River. Swampy land extends on both sides of these rivers for a mile and a half north of the Great Swamp proper.

The records of former botanical work done in this area are rather scattered and difficult to obtain. The most valuable data of course, are from the collections of Olney and Bennett which are largely in the Brown University Herbarium. Besides these there are scattered specimens from the collections of George Hunt, W. W. Bailey, J. W. Congdon and George A. Leland, all of whom have made trips into the swamp at rare intervals. There is no systematic record so far as known to me, of the flora of the Great Swamp region, and only occasional reference is made to it in Bennett's list of Rhode Island Plants, when he includes it in his reference to "South Kingstown." In two of Mr.

¹ See *Soil Survey of R. I.* by F. E. Bonsteel and E. P. Carr, Washington, 1905.

Olney's field note-books which are now in the possession of the Brown University Herbarium, there are notes of three trips into the swamp. These are recorded as occurring in 1846 and 1847. Without doubt other trips were made, but no more records were found. There are none of Mr. Bennett's notes accessible except his list already mentioned. In a letter recently received from the Hon. J. W. Congdon of Seattle, Washington, who formerly collected extensively in the swamp region, there are some interesting notes of his recollections of the area. Most of the plants he mentions were collected also by the writer last summer. He speaks of the relative abundance of *Habenaria ciliaris* and *H. blephariglottis* as well as of *Gaylussacia dumosa*. Besides these he gives a list of the Utricularias he has found there, namely *Utricularia biflora*, *clandestina*, *gibba*, *cornuta*, *resupinata*, and *subulata*. Growing in the muddy part of Worden's Pond were *Orontium aquaticum*, *Lachnanthes capitata*, *Xyris caroliniana*, *Sabbatia chloroides*, *Lobelia Dortmanna*, *Juncus militaris*, *Rhynchospora macrostachya*, and *R. fusca*. Mr. Leland has also kindly furnished me with a list of a few plants which he has from that area:—*Linum usitatissimum*, *Utricularia intermedia*, *U. inflata*, *Polygonum acre*, *P. dumetorum* var. *scandens*, *P. Careyi*, *P. hydropiperoides*, *Vaccinium pallidum*, and *V. atrococcum*.

During the latter part of August, 1906, the writer was able to make eight trips into the swamp from different directions as briefly indicated below:—

1. The marshy land on the west side of the Chipuxet River about a half a mile south of the Narragansett Pier R. R.
2. The corresponding swamp east of the Chipuxet near Larkin's pond.
3. The swamp between the Shickasheen River and the N. Y. N. H. & H. track, for a couple of miles south of the Kingstown station.
4. A similar region west of the Shickasheen River.
5. The portion of the swamp lying between the two hills already mentioned.
6. A strip of swamp land including the Fighting Ground and south of that to the Shickasheen River.
7. The northeast corner of Worden's Pond, and the swamp near by.
8. Portions of the pond itself and of the eastern shore.

It is difficult to determine the exact distribution of plants in an area

which, like the Great Swamp, is largely at the same level throughout. Thus the one hundred foot contour line marks in general the strictly swampy area, and Worden's Pond, which drains the swamp, is only ninety four feet above sea level, so that there is a dip of less than ten feet from north to south. There are, however, certain features which aid us in the matter. There are at least two important streams which pass through the swamp, the Chipuxet river, and the Shickasheen immediately west of the main railroad. This gives two different types of water areas viz. running and semi-stagnant, which of course merge imperceptibly into one another. A third type includes the two ponds, Worden's and Larkin's, which have a flora different in certain ways from either of the other two types. The temperature of the water was noticeably warmer in the swamp than along the river courses. Certain plants, though included in the swamp area, show a decided tendency to seek the drier portions, such as *Lespedeza frutescens* and *Rhexia Virginica*. The latter of these seemed to grow more luxuriantly, as a rule, in the wetter situations though the individuals were markedly fewer in number than in drier places. On the other hand many plants were decidedly attracted to the free water courses. A few such plants were *Lobelia cardinalis*, *Lycopus Virginicus* and notably *Bidens laevis*. The latter grew so abundantly along the streams of colder water that its dark foliage clearly marked them. The majority of the plants grow between the higher land and the rivers, seeming to prefer the open sunny places. The *Droseras* are in the less soggy parts and grow oftentimes on the dead *Sphagnum*. *Sarracenia purpurea*, *Xyris caroliniana* and *X. flexuosa* as well as a host of others inhabit these localities.

It is an interesting matter to find that, even in this formation, which is usually supposed to be especially favorable to monocotyledonous plants, aside from *Carex* the number of species is only about a third of the total number of Phanerogams found in the swamp. Hence even in the most favorable locations the Monocotyledons are outnumbered more than two to one. A large part of the swamp is heavily wooded. This is especially true of the area included between the Chipuxet River and the easternmost hill already mentioned. Here the deciduous trees predominate, though there are several groves of evergreens also. *Rhododendron maximum* grows in great luxuriance in this portion of the swamp.

In the following list of plants collected in the Great Swamp during

August, 1906, no name has been admitted if an authentic specimen was found in any of the Rhode Island Herbaria examined. Hence only about half of the plants collected are here recorded. A specimen of each species is in the writer's herbarium, and duplicates of the majority are also in the Brown University Herbarium.

PLANTS NOT HITHERTO RECORDED IN THE GREAT SWAMP FLORA.

- | | |
|---|--|
| <i>Dryopteris noveboracensis</i> (L.) Gray. | <i>Spiranthes gracilis</i> (Bigel.) Beek. |
| “ <i>simulata</i> Davenp. | <i>Goodyera pubescens</i> (Willd.) R. Br. |
| “ <i>spinulosa</i> (Retz.) Kuntze. | <i>Myrica asplenifolia</i> L. |
| “ <i>Thelypteris</i> (L.) Gray. | <i>Boehmeria cylindrica</i> (L.) Willd. |
| <i>Lycopodium complanatum</i> L. | <i>Polygonum arifolium</i> L. |
| “ <i>lucidulum</i> Michx. | “ <i>pennsylvanicum</i> L. |
| “ <i>obscurum</i> L. | “ <i>Persicaria</i> L. |
| <i>Sparganium americanum</i> Nutt. | “ <i>sagittatum</i> L. |
| <i>Sagittaria Engelmanniana</i> J. G. Smith. | “ <i>punctatum</i> Ell. |
| “ <i>latifolia</i> Willd. | <i>Lychnis alba</i> Mill. |
| <i>Calamagrostis cinnoides</i> (Muhl.) | <i>Spergula arvensis</i> L. |
| Scribn. | <i>Nymphaea odorata</i> Dryand. |
| <i>Glyceria canadensis</i> (Michx.) Trin. | <i>Nuphar advena</i> (Soland.) R. Br. |
| “ <i>obtusata</i> (Muhl.) Kuntze. | <i>Coptis trifolia</i> (L.) Salisb. |
| <i>Dulichium arundinaceum</i> (L.) Britton. | <i>Drosera intermedia</i> Haynes. |
| <i>Eriophorum virginicum</i> L. | “ <i>rotundifolia</i> L. |
| <i>Fimbristylis capillaris</i> (L.) Gray. | <i>Baptisia tinctoria</i> (L.) R. Br. |
| <i>Arisaema triphyllum</i> (L.) Torr. | <i>Medicago sativa</i> L. |
| <i>Xyris flexuosa</i> Muhl. | <i>Trifolium hybridum</i> L. |
| <i>Eriocaulon septangulare</i> L. | <i>Desmodium canadense</i> DC. |
| <i>Pontederia cordata</i> L. | “ <i>ciliare</i> (Muhl.) DC. |
| “ “ var. <i>lancifolia</i> Mo- | “ <i>paniculatum</i> (L.) DC. |
| rong. | “ <i>rigidum</i> DC. |
| <i>Juncus brevicaudatus</i> (Engelm.) Fer- | <i>Lespedeza capitata</i> Michx. |
| nald. | “ <i>frutescens</i> (L.) Britton. |
| <i>Juncus canadensis</i> J. Gay. | <i>Oxalis corniculata</i> L. |
| “ <i>marginatus</i> Rostk. | <i>Polygala Nuttallii</i> T. & G. |
| “ <i>pelocarpus</i> E. Mey. | “ <i>polygama</i> Walt. |
| “ <i>tenuis</i> Willd. var. <i>Williamsii</i> | <i>Euphorbia maculata</i> L. |
| Fernald. | <i>Rhus copallina</i> L. |
| <i>Medeola virginiana</i> L. | <i>Hypericum boreale</i> (Britton) Bicknell. |
| <i>Trillium cernuum</i> L. | “ <i>canadense</i> L. |
| “ <i>undulatum</i> Willd. | “ <i>gentianoides</i> (L.) BSP. |
| <i>Hypoxis erecta</i> L. | “ <i>maculatum</i> Walt. |
| <i>Cypripedium acaule</i> Ait. | “ <i>virginicum</i> L. |
| <i>Habenaria blephariglottis</i> (Willd.) Torr. | <i>Viola pedata</i> L. |
| “ <i>clavellata</i> (Michx.) Spreng. | <i>Chamaenerium angustifolium</i> (L.) |
| “ <i>psycodes</i> (L.) Gray. | Scop. |

- Oenothera biennis* L.
Kneiffia pumila (L.) Spach.
Aralia hispida Vent.
Cicuta bulbifera L.
 " *maculata* L.
Sium cicutaeifolium Gmel.
Cornus Amomum Mill.
Clethra alnifolia L.
Chimaphila umbellata (L.) Nutt.
 " *maculata* (L.) Pursh.
Rhododendron nudiflorum (L.) Torr.
Kalmia latifolia L.
Lysimachia quadrifolia L.
Bartonia virginica (L.) BSP.
Asclepias pulchra Ehrh.
Verbena hastata L.
Scutellaria lateriflora L.
Brunella vulgaris L.
Koelia virginiana (L.) Mac M.
Lycopus americanus Muhl.
 " *virginicus* L.
Mentha arvensis L.
- Ilysanthes attenuata* (Muhl.) Small.
 " *gratioloides* (L.) Benth.
Gerardia paupercula (Gray) Britton.
 " *purpurea* L.
Plantago aristata Michx.
Cephalanthus occidentalis L.
Galium asprellum Michx.
Viburnum cassinoides L.
 " *dentatum* L.
Campanula aparinoides Pursh.
Lobelia cardinalis L.
 " *inflata* L.
Vernonia noveboracensis (L.) Willd.
Chrysopsis falcata (Pursh) Ell.
Solidago odora Ait.
 " *puberula* Nutt.
 " *uliginosa* Nutt.
Anaphalis margaritacea (L.) B. & H.
Leontodon autumnale L.
Hieracium Gronovii L.
 " *scabrum* Michx.

PROVIDENCE, RHODE ISLAND.

THE RETROGRADE COLOR VARIETIES OF GRATIOLA AUREA.

HARLEY HARRIS BARTLETT.

At Winter Pond in Winchester, Massachusetts, occurs one of the most typical examples of what Blankinship designates in his "Plant-formations of Eastern Massachusetts" as the "Sand-Pond Margin Formation." Its flora is here unusually well developed, containing in addition to the plants enumerated by Blankinship about twenty others, equally characteristic of the formation. One of these, *Gratiola aurea* Muhl., occupies considerable areas of the low, gravelly shore, frequently to the almost complete exclusion of other plants. It occurs here not only in its typical golden-yellow-flowered form, but also in two well marked color forms the flowers of which are respectively honey-yellow and white.

Two published references to these forms have been found, the earlier of them, in John Robinson's "Flora of Essex County, Massachusetts," to the effect that "There is a white variety of this species which grows in Bowler Swamp, Lynn," the other, in Dame and Collins's "Flora of Middlesex County, Massachusetts," to the effect that "The white variety has been found at Winchester by W. H. Manning; both the white and light yellow varieties at Westfield, by Dr. Swan." In the Gray Herbarium there is a sheet of specimens collected by Dr. Swan in a swamp near Lowell, Mass., on which is written, in Dr. Gray's hand,—"*Gratiola aurea* vars. Ordinary golden-yellow. Pale yellow! White-flowered! in small quantity."

The two forms, as observed at Winter Pond, are absolutely distinct, without intermediates linking them either to the parent form or to each other. They occur in pure colonies, several of which have been under observation for three years, during which time they have been visited at various dates between July 1st and Sept. 15th, an interval which practically covers the flowering period of the species. Never has the honey-colored form been found in a white colony, nor vice versa, although this might be expected to happen occasionally through the casualties of seed dispersal.

The forms may be named: *Gratiola aurea* f. *helveola* f. nov. a forma typica recedit floribus albogilvis, corollae limbo quam tubo pallidiore. — Type (in Herb. Gray) collected by Dr. C. W. Swan at a swamp near Lowell, Mass. *Gratiola aurea* f. *leucantha* f. nov. a forma typica floribus clare albis differt. — Type (in Herb. Gray) Bartlett 820, Winter Pond, Winchester, Mass., 7 July 1907.

The significance of these forms (retrograde varieties of de Vries) as throwing light upon the origin of specific distinctions is clear at once when the flower-color of the other American species of § *Gratiolaria* is examined. (The often purple-flowered § *Sophranthe* may be left out of consideration on the ground of its great habital diversity.) We find: I) Species with golden-yellow flowers,—*G. aurea* Muhl., *G. Torreyi* Small and *G. pusilla* Torr. II) Species with flowers merely yellowish, the limb often white or whitish,—*G. gracilis* Benth., *G. floridana* Nutt., *G. virginiana* L., *G. viscosa* Schwein., *G. Drummondii* Benth. *G. ramosa* Walt. and *G. ebracteata* Benth. III) Species with white flowers,—*G. sphaerocarpa* Ell. and *G. macrantha* Chapm.

f. helveola corresponds to the second section in the above grouping, *f. leucantha* to the third. The golden-yellow color of the first group

is the resultant of two yellow elements, by the loss of which, either together or singly, retrogression may take place.

MEETING OF THE JOSSELYN BOTANICAL SOCIETY.—The thirteenth field meeting of the Josselyn Botanical Society of Maine was held at Oxford, Maine, from July 1st to 6th. Owing to various circumstances, there was a very small attendance, but those present found ample material to reward their efforts. The localities of especial interest were the low woods and sandy plains surrounding Whitney Pond, the rocky wooded shores of Thompson Lake, and the extensive arbor-vitae swamps in the town of Norway. The local botanists were very kind in pointing out localities of special interest; Mr. George R. Howe of Norway placing on exhibition his large collection of gems, insects, and other objects of natural history, as well as guiding the party on the trip to the Norway bogs. Mr. W. L. Bacon showed a large collection of the ferns of the region, including many of more than local interest.

A list of all the flowering plants and ferns seen or collected has been kept, and will be published later; the following list, therefore, represents only the plants of unusual interest. On the sand-plain near Whitney Pond large patches of *Lupinus perennis*, L., were found with *Corylus Americana*, Walt. and *Convolvulus spithameus* L. This is the first undoubted station for the Lupine in Maine, the record previously depending upon a report in the first edition of the Portland Catalog, (1868). Stations for *Aspidium cristatum clintonianum*, D. C. E., *Habenaria blephariglottis*, Torr., *Medicago denticulata* Willd., and *Erodium cicutarium*, L'Her., were found in Oxford; on the Norway trip, *Cystopteris bulbifera*, Bernh., *Cyrtopodium spectabile*, Salisb., *Habenaria hyperborea*, R. Br., and *Arceuthobium pusillum*, Peck. were found in abundance. The Dwarf Mistletoe was also found in a bog in Casco, Cumberland Co., with *Woodwardia Virginica*, Smith, and two plants of *Habenaria macrophylla*, Goldie, were secured in Otisfield.—EDWARD B. CHAMBERLAIN, Cumberland Center, Maine.

Vol. 9, no. 102, including pages 93 to 108 and plates 74 and 75 was issued 29 June, 1907.

A Model Botanical Text-Book

LEAVITT'S OUTLINES OF BOTANY,	\$1.00
With Gray's Field, Forest and Garden Flora, . . .	1.80
With Gray's Manual of Botany,	2.25

For the High School Laboratory and Class Room.

By ROBERT GREENLEAF LEAVITT, A. M., of the Ames Botanical Laboratory. Prepared at the request of the Botanical Department of Harvard University.

THE practical exercises and experiments have been so chosen that they may be performed by schools with even simple apparatus. The instructions for laboratory study are placed in divisions by themselves, preceding the related chapters of descriptive text. The book combines the best features of the newest methods with that lucidity and definiteness which have given Dr. Gray's text-books their extraordinary success. It pays special attention to ecology, but morphology and physiology are also fully treated. The illustrations number 384, and have been drawn with great care and accuracy. The appendix contains valuable suggestions for the teacher, and the index is very complete.

American Book Company

New York

Cincinnati

Chicago

Boston

HOME GROWN LILIES.

Fresh from Beds. Wild Flowers, Hardy plants of all kinds.
Send for catalogue.

F. H. HORSFORD, Charlotte, Vt.

1845 CONCORD NURSERIES, Concord, Mass. 1907
Hardy and Oriental Trees, Roses, Shrubs, Perennials, Paeonias, and Vines. Special attention given to the laying out of Estates and Old Fashioned Gardens. HENRY MINOT PRATT, Proprietor, Boston Office, 53 State St., 1165 Exchange Bldg. Telephone connection. P. O. 1 ox, 2647.

CAMBRIDGE BOTANICAL SUPPLY COMPANY, WAVERLEY, MASS.

BOTANICAL SUPPLIES OF EVERY DESCRIPTION. SAMPLES of *Mounting Papers, Genus Covers and Driers* mailed on request. POCKET LENSES from \$1 25 to \$5.50. Ask for the New Catalogue, No. 37.

PHYSIOLOGICAL APPARATUS, MICROSCOPIC MOUNTS, LANTERN SLIDES.
Intelligent Service. Standard Material. Immediate Shipment.

Advertisements of Nurserymen and Dealers in Botanical and other Scientific Publications are inserted in these pages at the following rates per space of 4 in. by 3-4 in. 1 year \$4.00, 6 months \$2.50.